ELECTRICAL REVIEW

[ILLUSTRATED.]

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Improved Balance Dynamometer for Weighing Transmitted Power.

The principle of this instrument is that to hold a weight in a horizontal position by a lever which represents the radius of a circle, at a constant distance from its center, takes as much power as to lift the same weight through the distance which would be traversed by it in any given number of revolutions around said center or axis, and in the time required for such number of revolutions. The engraving on this page will give a good idea of this machine, which is manufactured by the Lawrence Machine Shop, Lawrence, Mass.

Thus, in the present instance, the scale-beam or steelyard is the radius of a circle of which the circumference is ten feet, and the pin on which the weight is suspended would therefore traverse a distance of 1,000 feet in 100 revolutions.

Now, one pound lifted 1,000 feet is equal to 1,000 pounds lifted one foot, and the weights used on the dynamometer are numbered accordingly.

Following out the operation of the machine, we will suppose that twelve pounds are held up on the scale beam, and that the counter shows a speed of 100 revolutions in six seconds, a worm and gear being arranged so as to ring a gong bell at every 100 revolutions of the shafts.

The twelve pounds which are called 6,000 pounds (because the steelyard would only make fifty revolutions, if left free, while the shaft was making 100), are then divided by the number of seconds consumed in the 100 revolutions, and the result is $\frac{6000}{6}$=1,000 pounds lifted one foot in a second, which result being divided again by 550, the equivalent expression for a horse-power in feet per second (a horse-power being 33,000 pounds per foot per minute) gives one, and eight hundred and eighteen (1.818) thousands horse-power as the load passing through the machine.

On the receiving shaft in the present arrangement are fixed a pair of tight and loose pulleys at one end, and a spur gear at the other. This spur gear drives a corresponding gear of the same size and number of teeth, which is fixed on the end of a sleeve or collar, having on its other end a bevel gear, which forms one side of what is known as a "box" or compound gear. A corresponding gear on the opposite side of the box is keyed fast on the delivering shaft which passes through the sleeve above mentioned and also through the fulcrum of the scale beam. The two remaining sides of the "box" or "compound gear" are composed of a pair of equal and similar gears, which revolve freely around the scale beam on either side of the fulcrum. One would really be sufficient for the purpose, but a pair are used in order to preserve a balance.

When motion is given to the shafts by means of a belt to the receiving pulley, the intermediate gears revolve freely about the scale beam without effect, but when a belt is carried from the delivery pulley to the machine to be tested, the resistance causes the intermediates to act with the effect of levers on the scale beam, and would put the latter in revolution about its axis or fulcrum if it were not restrained by the weights, which are to be added and adjusted until a balance has been obtained. The dash pot or hydraulic regulator which is attached to the opposite end of the scale beam from the steelyard is for the purpose of checking vibrations and insuring steadiness in the motion of the scale beam.

The bevel gears are of cast steel and cut from the solid stock. The shafts, worm for gong bell, scale pan rod, dash rod, etc., are all machinery steel. The steelyard is of tool steel, forged. The central hub or fulcrum of the scale beam, around which the intermediate gears revolve, and through which the shaft passes, is of diamond bronze, to insure the necessary strength with the least friction.

A pair of pulleys are provided for each shaft, the inner one of each pair being keyed fast to the shaft, while the outer ones are fitted with set screws, having proper seats sunk in the shafts, so that they can be locked so as to make one wide driving pulley; or by releasing the set screws they can be made into a pair of fast and loose pulleys.

The gear teeth have been made of sufficient strength to resist the pressure of all the weights furnished with the instrument, if the whole strain was applied to one tooth, and as three teeth are always in contact at the same time the factor of safety is ample.

The power that can be weighed with this machine is equal to one horse-power for every one hundred revolutions of shafts, or to all the power that can be relied upon to be safely transmitted by a single belt three inches wide. The bearings are long, and in the sleeve carrying the "first" bevel gear are bushed so as to be easily replaced when worn. All parts are made to standard gauges, and all threads on bolts, nuts and screws are United States Standard.

The scale beams are made detachable for convenience in packing and transportation, and a guide wire or sight rod is provided, fitting into a socket frame and standing, when level, parallel with the steelyard, by which the operator can easily see when he has obtained a balance.

The floor space occupied by this instrument is thirty inches by twenty-four inches, and its weight for machine alone is 300 pounds, the weights for use which accompany it being 70 pounds in addition.

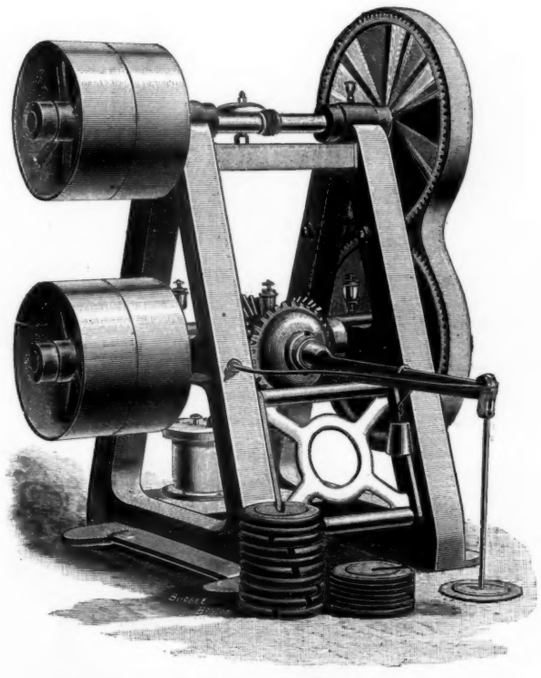
It will thus be seen that the dynamometer as constructed, gives the minimum of weight and space occupied for its capacity, and is easily adjusted in position and requires no change to be made in the position of the pulleys on the shaft or machine to be tested.

All that is necessary is to locate the Dynamometer in position to belt from the line shaft and to the machine which is to be tested, to fasten the legs to the floor with four lag bolts, and to attach the belts.

Power can be taken on to either the upper or lower shaft as the location may necessitate, care being taken, however, to have the bevel gears revolve so as to lift on the steelyard in all cases.

In every case the running balance of the dynamometer alone should be weighed before throwing off the belts after the completion of any test, and this balance (which represents the friction of the dynamometer) deducted from the gross weight, gives the net power consumed in the machine so tested.

Numerous tests of these machines with a Prony brake have shown the error, if any, to be remarkably small, and tests of machinery taking small amounts of power, but in totals aggregating 250 horse-power, have agreed within two per cent. of the results from indicator cards of engines driving the same machinery.



BALANCE DYNAMOMETER OF LAWRENCE MACHINE SHOP.

Utilizing Wind Power in Electric Lighting.

Editors Electrical Review:

Your article in issue of Aug. 7, on the above subject forces me on the defensive.

It was not my intention to decry the use of a wind engine for storing power *per se;* but on the contrary I had leanings toward its use, as another perusal of my letter will, I think, convince you.

On investigating the subject, I am quite convinced the wind engine would be in most cases an impracticable means of storing power in a storage battery.

You quote a man perhaps better informed on the subject than any other; but he uses the highest mean, while the lowest mean is not given. I will submit a few figures presently to show the lowest mean.

I shall not discuss the economy of the wind engine, nor that of the storage battery.

I shall, however, endeavor to show that your premises are altogether wrong.

The average speed of the wind in the United States has been ascertained by the signal service to be eight miles per hour. The observations from which these data are obtained were taken in the most favorable position. For obviously more wind blows on high points, such as signal service stations, than on lower and less favorable ones. Allow me to observe that the capacity table, giving the power of different-sized engines, is one calculated for a wind of sixteen miles, whereas the average is eight. It is to be presumed the engine is regulated to not exceed the speed it would attain under the sixteen-mile breeze. It will also be obvious that to obtain the result desired, the dynamo must run at a given speed. This will not be the case if the engine falls below the set speed—a speed it cannot maintain under less than a sixteen-mile wind. Very well, we will reduce the engine speed to not exceed the speed an eight-mile breeze would give it. Now we have reduced the pressure to one-fourth, and, of course, the horse-power to one-fourth of that we had, or six-tenths of a horse-power. Now, if we can average eight miles for eighteen hours, we can store 10.8 horse-power per hour—all we required under our original proposition. Can we do it? I have taken from the report of the signal service at New York a few data for 1885. The figures represent the slowest rate of wind for several successive days. The average is obtained from six observations. The data are for the extreme seasons.

1885.

DATE.	Rate of Wind: Miles per Day.	Average per Hour.	Maximum per Hour.
July 28.....	37	6.1	11
29.....	35	5.9	13
30.....	36	6.0	11
31.....	19	3.1	10
Aug. 9.....	24	4.	11
10.....	10	1.5	7
11.....	18	3.	12
12.....	20	3.3	13
20.....	16	2.6	11
21.....	24	4.	13
22.....	44	7.3	14
23.....	15	2.5	9
Nov. 5	42	7.	14
6.....	21	3.5	12
7.....	28	4.6	18
18.....	41	6	12
19.....	70	11.6	28
20.....	35	5.8	20
21.....	9	1.5	6
22.....	13	2.	11
23.....	Storm..118	19.	31

Now, referring to the above table, we find four successive days in July when the wind averaged considerably below six miles. For eight days in August we find an average of 3.5 miles per hour. For the first three days in November we have an average of five miles, and for the next five days an average of five miles per hour. For two days—the 21st and 22d—the average was less than two miles per hour, giving so small a fraction of a horse-power as to be altogether neglected. The proposition has been made that not less than six-mile wind will move a wind engine. This being the case, it seems quite clear that the engine would be practically at a stand-still during the 20 days in the table.

This being the case at New York, a very windy situation, what shall we say of places less favorably situated?

It has been determined from four years' observations made on board the British ship Challenger that the winds average on the open sea 17.5 miles, and on or near the coast 12.5, or 25 per cent. less than on the open sea.

Taking these observations as a base, it will be fair to suppose the difference between coast and inland would be 25 per cent., leaving a very small margin in some cases.

I have within a few days had a lengthy conversation with a prominent manufacturer of wind engines in this city, in which he expressed the opinion that it would require a 10 to 15-mile wind to move an engine, "geared," as it would necessarily be, to run a dynamo. I hardly see any reason to continue an argument so favorable to me.

In concluding, allow me to say it must be plain to one who has read this article carefully that a means of conserving the energy generated by the wind, at any and all times, to be used when required, a method conserving it in proportion to the strength of the wind blowing, is much to be preferred over one that requires a given speed of an element so fitful and unreliable.

In conclusion, I shall quote a passage from Spon's Dictionary of Engineering: "In all situations, however, where the cost of fuel is not extravagantly great, steam-power has superseded that of the wind, because the certainty of action more than repays the cost of its production." H. S. T.

New York, Aug. 9th.

The Phonoplex System of Telegraphy.

In all the electrical work of Mr. Edison no single device has become more quickly popular with the field it was intended to aid than the phonoplex. The increasing of telegraph facilities between terminal points by means of the duplex has been extensively adopted, but until this new method of transmission was brought out, no means were available by which the capacity of intermediate offices on a single Morse circuit could be increased. Through the use of the phonoplex system extra circuits are provided, by means of which more than double the amount of service may be derived from a single wire than is at present obtained, while its extreme simplicity of detail and adjustment places it within the easy control of the regular operators.

The principle upon which the system is operated is induction. The instruments employed for signaling respond only to induced currents thrown upon the line by transmitting devices, which currents interfere in no way with Morse instruments in the same circuit, being made to pass around them through condensers, while Morse waves in turn have no perceptible effect upon the phonoplex apparatus; thus two or more independent circuits may be provided on a single wire.

This system of telegraphy can be operated upon circuits one hundred miles in length, and in some instances on Western roads have greatly exceeded that distance.

All, or any desired number of intermediate offices may be doubled in their capacity, or communication can be established between terminal points only, regardless of whether such points are intermediate offices on a Morse wire, or Morse terminal stations. In short, between such offices as are equipped with the phonoplex, an extra circuit is provided the same as though an additional wire had been strung.

The system can be applied to duplex or quadruplex wires, and operated from the same terminals, or intermediate offices may be cut in and permitted to work as on an ordinary Morse circuit, without interfering with the operation of duplex or quadruplex instruments at either end. This enables a long stretch of wire to be utilized, which at present serves only two separate points.

In wet or heavy weather, when Morse wires are rendered almost unworkable through the presence of heavy escapes, the phonoplex circuits on the same lines are not in the least impaired. Instances have been frequent where Morse signals could be transmitted only half the length of a wire, owing to the cause mentioned, while the phonoplex system was operated the whole distance the same as under the most favorable conditions.

The apparatus for the equipment of an office consists of a key, transmitter, magnetic coil, small resistance box and the phone—which last responds to incoming signals; two condensers, two cells of gravity battery and four of electropoin, and the whole is arranged to occupy no more space than ordinary Morse instruments.

A complete and illustrated description of the phonoplex and all its parts are given below—the first comprehensive article that has yet appeared, and one that our readers w find valuable and interesting.

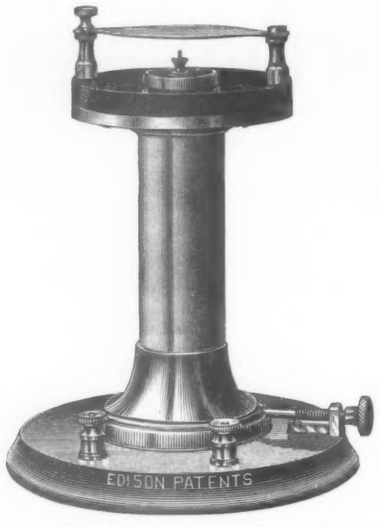


Fig. 1.—The Phone of the Phonoplex System.

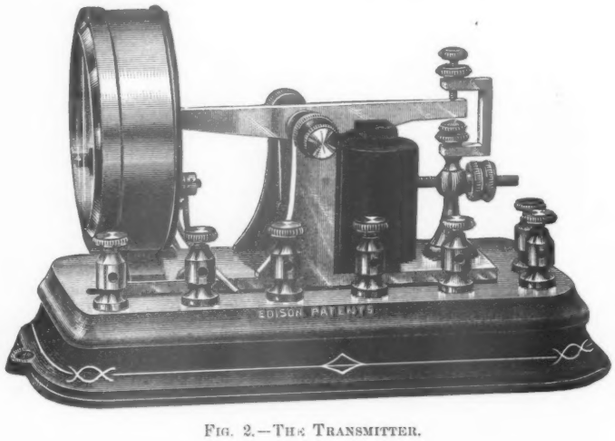


Fig. 2.—The Transmitter.

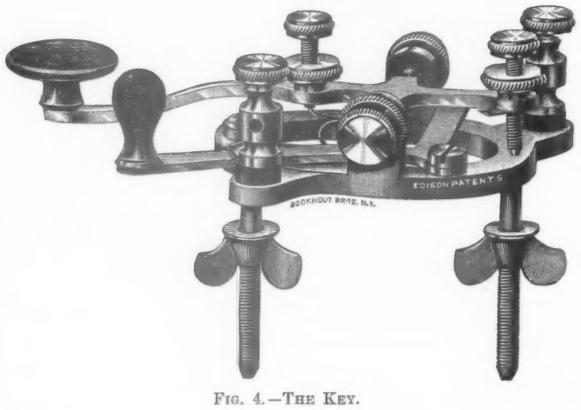


Fig. 4.—The Key.

Fig. 1—The Phone.

Fig. 1 represents the phone. A hollow column of brass resting upon a wooden base encloses the magnets. At the lower end is a rack and pinion by which these can be adjusted with reference to the diaphragm. To the center of the latter there is attached a screw-threaded pin with thumb nut and binder at the top and encircling the pin loosely is a split-hardened steel ring which rests upon the diaphragm. When the latter is snapped by the attraction of the momentary current in the magnet it throws the ring violently against the stop nuts and produces a sharp loud click. The steel ring has a pin projecting from its side that passes between two prongs, which, while permitting free up and down motion, prevent the ring from turning and altering the sound.

Over the top of the phone there is clamped a thin brass plate as a protection for the projecting screw.

Fig. 2—The Transmitter.

The transmitter (Fig. 2) is interposed between the key and the magnetic coil. The former operates the magnet of the transmitter, the object of which is to send uniform currents to the line and also to short-circuit the phone each time the coil battery circuit is broken, and thus obviate the annoyance which would otherwise be caused by the violent discharge close to the diaphragm.

Fig. 3—The Magnetic Coil.

In a small magnet is stored the energy which is exerted on the line for the purpose of operating the phones. As it is necessary to produce an instantaneous discharge, a condenser is connected around the points of the transmitter, which make and break the circuit around the coil. The magnetic coil is shown in Fig. 3.

Fig. 4—The Key.

The key, Fig. 4, is so constructed that when the lever is "opened" or thrown to the right, it closes the circuit around the magnetic coil through the points of the transmitter, and when "closed" or thrown to the left, it opens this battery and at the same time short-circuits the magnetic coil. The necessity for this lies in the fact that an open circuit electro-poin battery of low resistance is employed, which it is desirable to use only when occasion requires the transmission of signals, and also that the resistance of the coil has an audible effect in the phone when it remains in the line to retard incoming currents.

Thus while the manipulation of the key accomplishes all the objects it is desirable to attain, it introduces no innovation, as the same movements to which operators are accustomed are maintained—"opening" for the transmission and "closing" for the reception of business.

Fig. 5—The Resistance Box.

A small resistance box (Fig. 5) is interpolated in such a way that when the current through the magnetic coil is broken on the up-stroke it passes through the spools. This is to produce an audible distinction between the up and down movement as manifested in the phone, the former being lighter than the latter, so as to prevent confusion that otherwise would be occasioned by operators getting the "back-stroke."

Fig. 6—Instruments in Place.

In Fig. 6 are shown all the instruments in place. All Morse keys and relays within the limits of a phonoplex circuit are bridged as represented, by a condenser through which pass the induced currents that operate the phones. It will be readily seen that the main line, which passes through the magnetic coil and through the phone, is never broken, the former being charged and discharged by means of an extra circuit around it, through its key and the points of the transmitter.

This explains the fact that a phonoplex circuit remains intact so long as there is no actual breakage of the wires to which it is attached.

In the following diagrams are shown various methods of establishing extra circuits on Morse wires by the use of this system of telegraphy:

Diagram No. 1.

In diagram No. 1 the black line represents the established Morse circuit.

represents the offices through which it passes.

The dotted line represents the extra phonoplex circuit.

The diagram shows all offices equipped and doubled in their capacity.

In order to understand thoroughly the advantages derived from these extra circuits, as shown in this and following diagrams,

it is only necessary to bear in mind the fact that a phonoplex circuit provides facilities between such points as are included in it, the same as though an additional wire had been strung without reference to the line to which it is attached.

DIAGRAM NO. 2.

Diagram No. 2 shows half the offices doubled in their capacity.

Those which are touched by the dotted line can communicate with each other either on the Morse side or by means of the phonoplex circuit.

In the "blind" stations—those which the dotted line avoids—the keys and relays are bridged by condensers to afford a channel through them for the phone currents. They can at any time be included in the phone circuit by the introduction of the necessary instruments.

DIAGRAM NO. 3.

Diagram No. 3 shows a phonoplex circuit established between intermediate offices.

The induced currents which operate the phones in this circuit are thrown to the ground at the phonoplex terminal stations through condensers. Thus it is not necessary to bridge the keys or relays of offices outside these points.

DIAGRAM NO. 4.

Diagram No. 4 represents a wire equipped to half its length with the phonoplex system.

DIAGRAM NO. 5.

Diagram No. 5 illustrates a through phone circuit established on a way wire.

DIAGRAM NO. 6.

Diagram No. 6 represents a through wire, 300 miles in length, and illustrates the manner in which three extra phonoplex circuits, each of one 100 miles, may be established for the purpose of absorbing local business.

DIAGRAM NO. 7.

Diagram No. 7 shows two Morse wires running in different directions, but parallel for a portion of the distance.

The first is phonoplexed to half its length, and the induced currents are then thrown into the second wire, and pass through a partial number of its stations. In this way communication is established between a number of offices on each wire, which otherwise are unable to work directly with each other.

DIAGRAM NO. 8.

Diagram No. 8 represents a Morse duplex circuit the wire passing intermediate offices.

The illustration shows how communication may be established between these intermediate stations, or any of them, by cutting them in on a phonoplex circuit, annexed to the duplex wire.

DIAGRAM NO. 9.

Diagram No. 9 in the same manner illustrates the phonoplex system applied to a quadruplex line for the purpose of utilizing it as a way wire.

It will be readily seen from these illustrations that the phonoplex system is capable of a great variety of convenient combinations, which it would be impossible to effect by means of any other known system of telegraphy.

The system is capable of many variations in the arrangement of circuits, one of the most conspicuous, on account of its usefulness, being the establishment of communication on two separate Morse wires between offices which otherwise are unable to work direc with each other.

This is accomplished by what is known as "jumping." For instance, two wires, running in different directions, cross each other at a certain place. The first of these is phonoplexed to the point of intersection with the second, and the induced currents are then thrown into the latter through a condenser, and pass to ground through such offices on wire No. 2 as are prepared for their reception. This convenient and novel method is in practical operation on the Kansas & Southern Railway, and is giving universal satisfaction.

The Atchison, Topeka & Santa Fe Railway Company, the Baltimore & Ohio Telegraph Company, the G. N. W. Telegraph Company, of Canada, are all using the phonoplex system of telegraphy, and numbers of applications for circuits to be applied have been received from railroads in the United States and Canada who, already at this early stage in the development of the enterprise, recognize its value in point of economy and convenient adaptability.

The system is under the general management of Mr. Samuel Insull (Mr. Edison's representative), of 40 and 42 Wall street, New York, to whom all communications should be addressed.

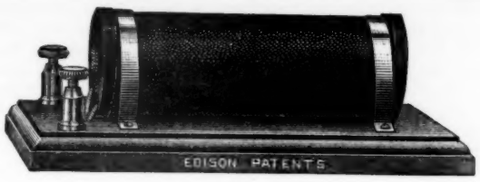


FIG. 3.—THE MAGNETIC COIL.

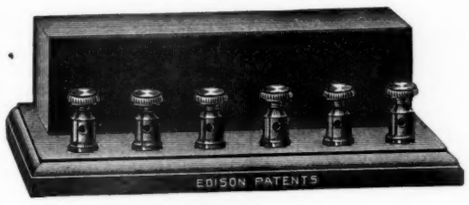


FIG. 5.—RESISTANCE BOX.

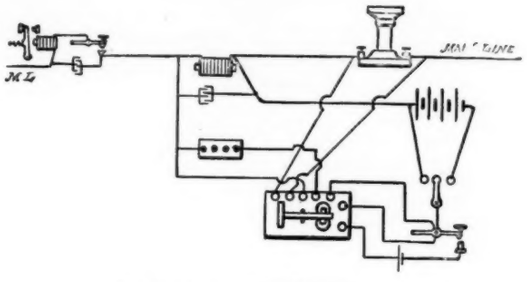


FIG. 6.—INSTRUMENTS CONNECTED.

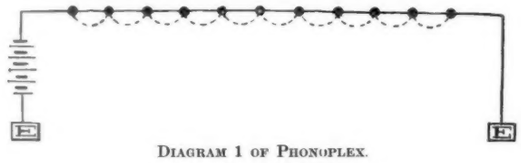


DIAGRAM 1 OF PHONOPLEX.

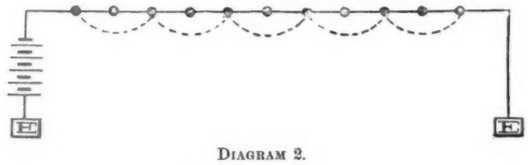


DIAGRAM 2.

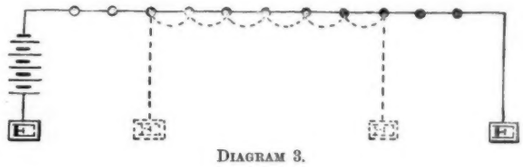


DIAGRAM 3.

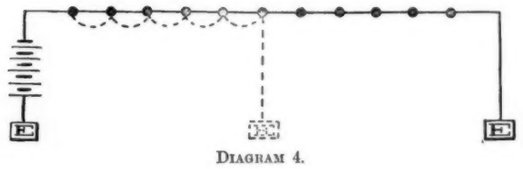


DIAGRAM 4.

DIAGRAM 5.

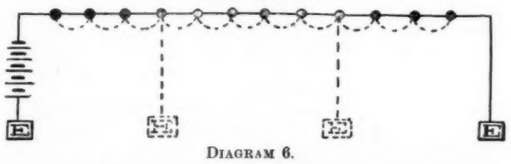


DIAGRAM 6.

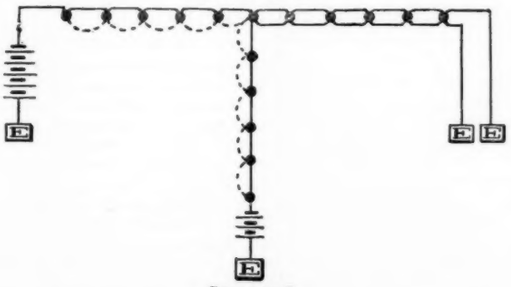


DIAGRAM 7.

DIAGRAM 8.

DIAGRAM 9.

Manufacturing Notes from Cincinnati.

H. L. Shepherd, of 131 E. Second street, Cincinnati, who manufactures a small lathe specially adapted for electrical manufacturing, reports business as very good. He has sold 12 lathes during the past week to electricians.

W. N. Gray, who is the representative here for the Mather Electric Company, of Hartford, reports business as booming, says he has more inquiries for estimates than ever before. He is erecting a 10-light arc plant and 125 incandescent at the exposition building. The station spoken of in an issue of the REVIEW as being built at Fourth and Walnut, proves in every way a success. He has connected with him Messrs. Ferry & Son, who are old and well known citizens. All the plants erected by this company are giving satisfaction.

In looking through the new factory of C. E. Jones & Bro. one is impressed with the efficiency with which every detail is carried on. Everything in the way of tools for the manufacturing of electrical goods can be found here. It is one of the most complete works it has been the privilege of your representative to visit. Their experimental department is kept very busy.

The Edison Company are erecting a central station plant here for their incandescent system, and expect to have it in operation soon.

CINCINNATI, Aug. 13, 1886.

* * * There is a singular case reported from Providence. It is that of a 10-year-old girl who, until recently, was a terrible sufferer from St. Vitus' dance. She could not stand still, and so was in a sad state. Some one suggested that she be treated with electric shocks, and accordingly a medium wire—such as is used for the inside incandescent lights—was run from the Rhode Island Electric Company's Works to the street circuit wire. The girl comes daily to the works and will seize the wire with both hands and hold it as though it were a piece of wood. The shock that this wire will give is enough to knock a man out, yet the girl laughs at the idea, and is said to be rapidly improving under the treatment.

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Mr. C. C. Haskins, 118 LaSalle Street, Chicago, Ill, will represent the REVIEW in the West

Messrs. Wm. Dawson & Sons, 121 Cannon Street, London, England, are our representatives for Great Britain.

NEW YORK, AUGUST 21, 1886

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To electric light men: Plan to be at Detroit August 31st.

The ELECTRICAL REVIEW is one of the best-humored papers in this country. And who wouldn't feel good with such an intelligent and appreciative constituency as our subscription lists and advertising patronage disclose?

Telephone circles are somewhat agitated over the rumors from Washington concerning the effect of the action of the Patent Office in the case of the Gray application. There seems to be a suspicion that the application has been reinstated, and the next question is "Will it be granted, and will the patent be given to the Gray Company?" As the application, if reinstated as reported, which we seriously doubt, is now three months old, it is expected that the coming week will bring an answer to this question. It is thought by some that the Bell and Gray interests are really acting together, and have pooled their issues so as to insure a mutual profit from an extension of time for the telephone patents. The Bell patent would run out in about seven years more while a new patent, if granted now, would have seventeen years to run. Even if the two interests are fighting each other, it is not clear to us how the new dispensation could dispose the old one under any circumstances, and this is a point to be argued by the lawyers, who may be depended on to make as much of it as they possibly can.

Gas stocks are on the decline in Paris, owing to the uninterruped success of electric light installations that have recently been put up in the principal places of amusement and elsewhere. Our unsolicited, but nevertheless freely given, advice to the gas companies is to get the contract for furnishing gas to heat the boilers of the electric companies, and if they can't get even on the gas bills rendered all tradition will receive a death blow.

A number of wise gentlemen, possessed of persuasive eloquence, have insisted on receiving that prominence in our advertising columns that the merits of their wares justify. Their words prove their faith in their goods—a fact that the public appreciates, and one that makes advertising so valuable to the intelligent advertiser. Notwithstanding the press on the pages of the REVIEW, we have never permitted advertising to encroach on the space devoted to reading matter, ever presenting for the edification and instruction of our readers thirty-six columns of carefully-edited electrical information.

The history and achievements of the "long-distance" telephone experiments and experimenters, which appeared in recent issues of this journal, have increased the interest in this important branch of telephony, and the further detailed information relating to the subject, which will probably be given at the St. Louis convention, is awaited with considerable expectancy. The investigations and daily practical trials and tests made by the electricians of the American Telephone and Telegraph Company in their work on the New York and Philadelphia lines, brought to the surface many new, not to say queer, problems, the working out of which furnished these capable gentlemen with much intense mental and active physical employment. We trust their triumphs will not only advance the practical interests of the telephone, but furnish additional nuts for our rapidly-recruiting army of enthusiastic electricians to crack.

IS IT BY ELECTRICITY?

So many rubies have recently been placed upon the Paris market, dealers have become suspicious of fraud; although tested chemically the stones answer the true definition of the Oriental ruby. The chemist is satisfied, but the expert has his doubts, in view of the diamond fraud of last year. From certain indications it is suspected that Swiss artificers have learned how to melt a number of small rubies and consolidate them into one.

If they have gone so far, it will be a short step to transform emery into rubies.

THE DESTINY OF THE VOLTAIC ARC LIGHT.

A recent despatch from Troy, N. Y., reads: "Half the city is already lighted by electricity, the installation being an experiment set afoot some time ago. Now that the Trojans have had a taste of electrical lighting they want more, turn up their noses at the mention of gas, and insist that the balance of the city shall be lighted by electricity." We don't quote this because it contains anything remarkable, for despatches of a like nature appear almost every day in the public prints; we quote it only to compare the reception of the electric light now with that of a few years ago when first it was declared by its projectors to furnish a practical, reliable and efficient means of lighting the public streets. Like the telephone, when first thrust before the public, the electric light—we speak now of the voltaic arc—was a thing which seemed to possess a value, but the question was, how could it be practically utilized? It gave trouble at first, as every original contrivance is apt to do. Its worst fault was its uncertainty. The average citizen, as we know, always demands perfection, forgetting that perfection is not given to mortals, and hence is as impossible to man as a vacuum is abhorrent to nature. The public saw one voltaic arc light suddenly cease to glow on a rainy night and instantly jumped to the conclusion that the electric light, so far as lighting the streets was concerned, was utterly worthless. The conclusion was founded upon and deduced from the premise. The premise, however, was faulty, and hence, as has now been proved, the conclusion was misleading and valueless. The light didn't go out because it was generated by electricity, but only because the methods for utilizing it had not been perfected.

It was a good point for the gas companies, however, and it may fairly be said for them that they made the most of it. Their light, like their bills, went on eternally, ever expanding and renewing itself. It did some other things, such, for instance, as smelling badly, vitiating the atmosphere and sputtering, but it never went out. They were not afraid of electricity. It might be used for lighting large halls when an electrician stood by to see that it behaved itself, but it could never enter into serious competition with gas for the lighting of thoroughfares and dwellings. The electric light projectors, however, thought otherwise. They went on improving their methods of distributing, generating and feeding, and step by step they saw it gain in the public confidence. Among its first successful trials was the lighting of parks, such as Union, Madison and the battery, New York city. Then it was tried along a small section of streets and avenues. Changes became necessary, and as soon as their importance became evident, they were increased. Portions of a city or town when once lighted by electricity and given a trial, those living therein would have no other light. They could not come back to gas any more than they could come back to oil lamps or farthing dips. They would have electricity or nothing, and so the demand for the light grew. Rochester, N. Y., was lighted up by an electric current generated on the banks of the Genesee river. Niagara Falls and vicinity got its electrical energy from its water-power, and soon the craze for electric light spread from town to town, from city to city, throughout the country, until now, when a multitude of great electric light companies and hundreds of sub companies cannot keep pace with the demand for voltaic arc lighting. What this will lead to in the future requires only ordinary perception to foresee. A few years hence it will be only one-horse towns that will not be electrically lighted and from one end of the country to the other there will be an almost unbroken line of dazzling lights, and the destiny of the voltaic arc will have been fulfilled.

ELECTRICITY AND GAS.

The success which has so far attended the general introduction of the electric light as an illuminant, throughout the country during the past five years, notwithstanding the strong oppositions of the gas companies, and the many obstacles which the older electric light companies have manfully met and overcome, has caused a great change in the attitude of the gas men towards the new illuminant.

The managers and officers of gas companies generally, throughout the United States and Canada, as well as conservative business men, who are always alive to the importance of all new business enterprises of real merit and possessing a capacity for money-making, have come to the conclusion that the electric light has come to stay, and that it is to-day entitled to be ranked as one of the permanent business industries of the country, which has successfully fought its way into a position where it must be recognized as such.

This is not all. These same men have also made another important discovery—that instead of the gas and electric light companies longer continuing in the attitude of business rivals, they should become allies.

Mr. Edwards H. Goff, president of the American Electric Manufacturing Company, is probably the father of this idea; to our certain knowledge, he has steadily advocated it for the past three or four years among gas and electric light men; and it must be a source of gratification to him to see this plan, once so unpopular and generally condemned as impracticable, now looked upon as an important feature of greater financial success in both branches of artificial illumination.

Of course, wherever this plan of combination is adopted, it must be done in good faith towards each system of lighting—*i. e.*, the gas company must not adopt the electric light simply as a ruse to keep out competition and hold the field, or *vice versa*.

A Wall street journal says: "The advantage of being able to control both gas and electric light will at once strike the reader. A company handling both will be able to supply whichever is needed. Gas and electricity are the two great lights of civilization. One or the other we must have, and no substitute is obtainable. There are innumerable small towns and villages abundantly able to support a small plant, which have neither. A company that will undertake to furnish either light wherever it is wanted, or the plant for making the light, will make enormous profits."

During the past five years Mr. Goff has installed a very large number of electric light central stations, which are now doing a successful business; and, now that his ideas of combining the two great industries seem to be meeting with favor, it is not to be wondered at that he should be first in the field with a plan for a combined "Gas and Electric Light Construction Company," which will adopt the American system of electric lighting as the electric light side of the compact.

It is said that Mr Goff's plan is to organize this construction company with a cash capital of $3,000,000 to $5,000,000. The gas men of the country will find that the adoption of a plan of this kind is much better than fighting the electric interests—which are gaining ground every day. What the public wants is better light and more of it, and the wise stockholder in a gas or electric light company is the one that decides to supply this demand, whether its source be the coke in the gas works or the coal in the furnace of the electric light station.

RATES TO THE ELECTRIC LIGHT CONVENTION.

The following letter from the Chairman of the Transportation Committee, will be of interest to all members of the National Electric Light Association:

PATERSON, N. J., Aug. 16, 1886.

A. J. De Camp, Esq., Chairman Executive Committee, National Electric Light Association.

DEAR SIR:—

Certificates for reduced rates to the Detroit convention are now ready and can be had upon application to me as follows: Via New York, Lake Erie and Western Railroad, from New York to Suspension Bridge, fare for the round trip, $13.90. These certificates will be honored at any office of the company in New York city.

Delegates coming via New York should apply at once. Unless the Western Trunk Line Committee make the promised reduction, (which if made will be announced this week) delegates will be obliged to purchase the regular ticket at Suspension Bridge to Detroit and return, and will have ample time to do so at Suspension Bridge.

The 7 o'clock train from New York, on Sunday, Aug. 29, is the best train to take, arriving in Detroit at 1.30 P. M., Monday. I can tell better after certificates are issued, what reduction can be made with Pullman Palace Car Company, for sleeping car accommodations.

S. A. Duncan, Esq., of Pittsburg, Pa., of the Committee on Transportation will issue certificates from Pittsburgh to Detroit and return, fare $9, via Pennsylvania Railroad, to such of our members as are near that point.

L. M. Fishback, Esq., St. Louis, Mo., of the same committee, will issue certificates via Wabash system, to those of our members in his locality.

There will undoubtedly be further reductions that will be announced by circular this week. Let the fraternity turn out in full force. Yours truly,

J. F. NOONAN, Chairman.

CHICAGO ELECTRICAL NEWS.

The Appleton, Wis., people are more than tickled with their new electrical street railway. The inventor tells, in his own way, of a curious balk on the day of starting the first train. Every available spot, even to the space beneath the seats, was occupied by some form of animated nature. The seats were filled, and between people were boys. Men clung on by one foot and a band, and a boy sat between him, under him, on him—any place where there was space to put the seat of his "little panties," the sole of his foot, the palm of his hand, or the two outer joints of his dirty claws.

Something like ten tons of weight were holding the car to the rail when the order "Let her go" was given. The inventor, who had the motor in charge, switched in the current, but the wagon didn't stir. Then a messenger went to the nearest telephone and "hulloed" that a little more current be sent, as the load was gluing the car to the track. The car still refused to budge and the fruit that grows on the "I-told-you-so" tree was just ready to drop when the inventor inquired by telephone of the party at the dynamo "if the brushes were on?" That settled it. The next time he turned the lever the car started off as if it had always run, and the yells of the pleased and half-crazy people startled every animal in the neighborhood. In the Appleton road, both wires are placed in the air. This obviates both the necessity for special care in insulating the line, to prevent loss by leakage, and the possible danger to life and property by ground contacts.

The people on the other side of the Atlantic are agitating the question of a more general system of electrical tramways, and an electrical expert from London is carefully investigating the Appleton plant, with a view to adopting the system.

The Minneapolis *Tribune* of the 8th says: "The soda motors are expected now in from ten days to two weeks. It is expected that the world will tip up in consequence of their arrival, and their working will be watched with a good deal of interest.

[The soda motors may, in consequence of the difference in latitude, tip the world up at Minneapolis, but they didn't do it here.] The train used consists of three passenger cars.

There is strife among the Central plant people here. Underground electric light running is not unlike mining With the most faithful adherence to the upright and honest intentions which are the moral stay of all electric light people, they will occasionally trespass on each other's territory—will occasionally damage profits by cutting rates. It can't be helped.

The Chicago Opera House, which has been completely overhauled and amended, is greatly improved in every way. As formerly arranged, it was impossible to give satisfaction to holders of a large number of seats at the sides of the house. In the present arrangement the crooked places are made straight, the stage has been brought a little forward, and a group of forty-eight additional Edison lights placed above the illuminated centerpiece, producing a grand and artistic effect.

Frank Badt, electrician of the United States Company here, is rejoicing over between twelve and thirteen pounds of young lady which has become a regular boarder at Mrs. B.'s table. The damsel is so lively and strong that it has been suggested to name her Ohm—she offers so much resistance at times, you know.

Among the licenses issued to new corporations by the Secretary of State, on the 11th instant, was one to the Husico-Electrical Medical Apparatus Company at Chicago, with capital stock $300,000—David M. Alexander, Henry Plowman, Jr., and Robert M. Brett, incorporators—and the Electric Mail Box Company, of Illinois, capital $50,000—Francis W. Corey, Arthur F. Raze and Chas. H. Baker, incorporators—both Chicago enterprises. The Wunder & Abbott Central plant has assumed more enterprising proportions, and is now incorporated under the State law as the Wunder & Abbott Illuminating Company, with a capital of $35,000, divided into shares of one hundred dollars each.

On the 8th inst. lightning struck the barn of the Omaha Driving Park Association, setting the buildings on fire. Several valuable horses were lost, whose names were well known in sporting circles. Dick Wild, a 3-year old pacer, valued at $3,000; Ida, a 3-year old, valued at $1,600, and Capt. P., a 4-year old trotter, worth $1,500—were killed by the shock; and Mascotte, whose trotting record is 27½; Little Wilkes, record 32; Red R., Legal Tender, trotting record 3, pacing 3,20, and others were burned to death. A colt, 300 yards from the barn, was killed by the shock. The horses had accumulated at that point in anticipation of the racing season.

On the 9th, a prominent citizen of Crawford county, Indiana, a Mr. Riley, was killed by a bolt of lightning. He was sitting at the time in a front room of his house, mending a pair of scissors. A slight shower was falling at the time, but there was no indications of a thunder storm. The family, sitting upon the verandah, saw a ball of fire enter the window, and apparently disappear up the chimney. On entering the room where Mr. R. had been sitting he was found lying upon the floor, burned nearly to a cinder, and unrecognizable. A black streak was found on the carpet, within a few inches of the chair in which he had sat, and thence to the fire-place. A strong odor, likened to sulphur by the family, pervaded the room. Probably, this was due to the presence of a large quantity of ozone.

A correspondent of electrical papers hunting for items, sometimes encounters queer things. Not long since the writer, having struck what he considered a live trail, dived into a dark, blind alley, up a rickety stair-way, and after groping for some time stumbling over sundry and divers kitchen and housekeeping utensils, finally struck a door, locked as solidly as a bank safe. For some time the rat-tat-tat on the battened door was unanswered; but eventually the door opened—a mere crack, and a voice demanded, "Who are you, and what do you want?" with an air of mysticism which suggested an unwitting ride on a goat, blindfolded. An instant later, and it proved to be a beloved, long-lost brother, with a-mole-on-your-left-shoulder, electrician who has been missing from his accustomed haunts for a year or more. Perched away up next the roof, in a little 7x9 room, a bench and a lathe his sole companions, he is working secretly, but faithfully on an improvement in electrical devices which is to astonish the world. Joking apart, there is plenty of ingenuity, inventive genius and ability in the man, and plenty of result to be obtained in the object sought; but there is secrecy enough, as well, to keep the outside world from knowing anything about it, till, by and by, when the REVIEW will give it, root and branch, to its readers.

CHICAGO, Ill., August 16.

The Electrical Frost Bell.

The frost bell is doubtless the means of saving many tons of grapes in the northern portions of California, where the frost sometimes does so much damage. It consists of a wire running from different parts of the vineyard to the house. On the vineyard end of the wire is an apparatus that rings a bell at the house when the thermometer descends to a certain degree. When the bell is let off, the occupants of the house know that their vines are in danger, and immediately repair to the vineyard and light fires in different quarters, and thus prevent, through the agency of this ingenious electrical device, the loss of tons of the most luscious fruit grown on the Pacific slope.—*Ex.*

As stated in the REVIEW for April 10, 1886, this application of electricity has been used in France, and is the invention of a telegraph inspector, M. Lestelle.

Electric Light Building Burned.

The large Brush station at 202 to 210 Elizabeth street, New York City, supplying over 800 arc lights was almost entirely destroyed by fire last Monday night. The fire began on the second floor of the three-story building, and is supposed to have been caused by a shaft heated at the journal from friction. In four minutes from the time of the first alarm at 7 28 o'clock the entire three-story building was in flames. The ten boilers, engines of a capacity up to 180 horse-power, and the forty dynamos or generators were the costly part of the plant, which was valued in the aggregate at $200,000, and the loss will amount to probably $150,000, all covered by insurance. The West Twenty-fifth street station was still serving 400 lights between Fifty-ninth and Fourteenth streets when the firemen got to Elizabeth street. At the outbreak of the fire the electric light men connected the eastern system with the western by a switch at the Bowery and Fifth street, but the firemen feared that in their wet clothing they would be in danger at their work with the wires alive, and orders were telephoned up to Twenty-fifth street to shut down altogether, and the 1,200 lights were extinct. The Bowery looked pretty black, although other companies have a number of electric lights there.

At midnight all the lights were burning again except the west head lights in Madison and Union squares. Chief Engineer Wright says that the company can supply all the lights from the west side station alone.

The offices of the parent company—the Brush-Swan Electric Light Company of New England—were in the building that was burned.

A Grand Invention.

According to the *Court Journal*, a wealthy ironmaster in the north of England, whose house and works are dazzlingly illuminated by the electric light, has adopted an ingenious contrivance, by which he may glean some information as to what goes on during his not unfrequent absences from home. In several of his rooms and in his offices there is a concealed apparatus in the walls, consisting of a roll of Eastman paper and a train of clockwork. Every hour a shutter is silently opened by the machinery, and an instantaneous photograph is taken of all that is going on in the room. On the great man's return he delights to develop these pictures, and it is said that they have furnished some very strange information indeed. One clerk, who received his dismissal somewhat unexpectedly, and boldly wanted to know the reason why, was horrified when shown a photograph in which he was depicted lolling in an easy chair, with his feet upon the office desk, while the clock on the mantelpiece pointed to an hour at which he ought to have been at his busiest. The servants' party in the best dining room furnished another thrilling scene.

The American Company last week completed arrangements for the opening of an agency in Demerara, South America, for British Guiana and the West India Islands.

The telegraph switch recently invented by Messrs. Walters and Sweeny, of Terre Haute, is said by telegraphic experts to be a very valuable invention. It has already been adopted by the Vandalia Railroad, and is likely to come into general use. Waters is a student at Rose Polytechnic Institute, and Sweeny is a telegraph repairer, employed by the Vandalia.

Dr. Worms has recently made known to the Academy of Medicine the results of his investigations concerning Daltonism and other sorts of color-blindness among the *personnel* of the Northern railway. The number of persons examined is 11,173, and the proportion of defective color-vision is a very small one. Two persons only were utterly incapable of distinguishing one color from another; three were color-blind for red; six for green; eighteen mistook green for red; fifteen could not distinguish green from blue or gray; fifty-two had a certain weakness in color-vision. Upon the whole, the defects of color-vision are very scarce among the persons examined by M. Worms; and there is not much danger to be feared for railroad travellers from these defects.

Wrinkles — Electrical and Otherwise Practical Information.

To mend India rubber, the following can be relied upon. Procure a small tin box of prepared rubber, in a semi-liquid condition, which can be purchased for a few cents at almost any store where rubber goods are sold. The article to be mended must be washed, clean and dried. Then roughen the surface around the rent with the point of a knife; after which the semi-liquid rubber is spread on with a spoon as thickly as possible without flowing away. Then prepare a neat patch and cover with one or two coats of rubber. When the prepared rubber is almost dry, the patch is applied and held firmly for a few minutes.

Benzine being one of the most volatile and inflammable products, resulted from the distillation of petroleum; it vaporizes with great rapidity, so that the contents of a 4 oz. viol, if overturned, would render the air of a moderate-sized room highly explosive. The greatest care should be exercised in handling this substance in proximity to fire or electric light apparatus, and it is important to remember that the vapor escaping from an uncorked bottle will cause a flame to leap over a space of several feet.

A cement suitable for joining metals to non-metallic substances; dissolve 2¼ lbs. glue in boiling water and 2 oz. gum ammonia, adding in small quantities about 2 oz. sulphuric acid.

A very good impression of any article of metal having a flat, ornamental surface may be taken by wetting some note paper with the tongue and smoking it over a gas flame. The article is then pressed upon the smoked part, when, if the operation be carefully conducted, a clear impression will appear. This can be made permanent by drawing the paper through milk and afterwards drying it.

To remove rust from steel, apply kerosene oil, and when loosened, the rust can be rubbed off readily.

It has been suggested that, in order to insure greater strength and consequently more safety in ropes used for scaffolding purposes—particularly in localities where the atmosphere is destructive of hemp fibre—such ropes should be dipped, when dry, into a bath containing 20 grains of sulphate of copper per litre in water, and kept in soak in this solution some four days; the ropes will thus have absorbed a certain quantity of sulphate of copper, which will preserve them for some time both from the attacks of animal parasites and from rot.

A new compound for cleaning and polishing metals is composed of 1 oz. carbonate ammonia, dissolved in 4 oz. water; with this is mixed 16 oz. Paris white. A moistened sponge is dipped in the powder, and rubbed lightly over the surface of the metal, after which the powder is dusted off, leaving a brilliant luster.

To brighten iron. The following method, which appears suitable for some of the less important parts of large clocks, is recommended by Boden: The articles to be brightened are, when taken from the forge or the rolls, in the case of such articles as plate, wire, etc., placed in diluted sulphuric acid (1 to 20), where they remain for about one hour. This has the effect of cleaning them, and they are washed clean with water and dried with sawdust. They are then dipped for about a second in commercial nitrous acid, washed carefully, dried in sawdust and rubbed clean. It is said that iron goods, thus treated, acquire, without undergoing any of the usual polishing operation, a bright surface having a white glance. Care should be taken not to inhale the fumes of the nitrous acid.

To demagnetize steel, first heat it to a red heat, allowing it to cool slowly. Then place the steel on the magnet, with the like poles touching each other, repeating the operation until total demagnetization has taken place.

Telephonic News

⁂ What has become of the man with the magneto-transmitter that was going to supplant the battery transmitter?

⁂ All departments of the extensive factories of the Ansonia Brass and Copper Company are full of work. The business of this great house has never been better.

⁂ The District Commissioners (Washington) have concluded a new arrangement with Mr. Bryan, general manager of the Chesapeake and Potomac Telephone Company, and at somewhat advanced rates.

⁂ The National Telephone Company have decided to immediately commence the construction of several telephone lines between Dundee and Glasgow, with branch lines to Edinburgh and other towns in that part of Scotland.

⁂ German experts say that Schleimann's excavations in Greece have revealed a wealth of material for designers in woolen goods. The ancient patterns reproduced in modern fabrics would have a charming effect. But he has'n't dug up the only and original telephone yet. That is probably nearer the azoic formation.

⁂ In the case of Ida M. W. Sawyer and the Buffalo City Cemetery Association against the Bell Telephone Company, of Buffalo, Judge Beckwith made an order modifying the former injunction, and allowing the company to string wires on the poles already erected in Maryland street, Wadsworth place, and on Arlington place. The company thus obtains the right to do just what was originally intended.

⁂ The magneto bell, manufactured by the Standard Electrical Works, Cincinnati, is in demand in telephonic circles, its excellent staying qualities having been fully demonstrated. We learn that Mr. E. V. Cherry, the head of the Standard Company, has been seriously ill for several weeks, but has now fully recovered, and will, no doubt, be at the St. Louis Telephone Convention as active and enthusiastic as of old.

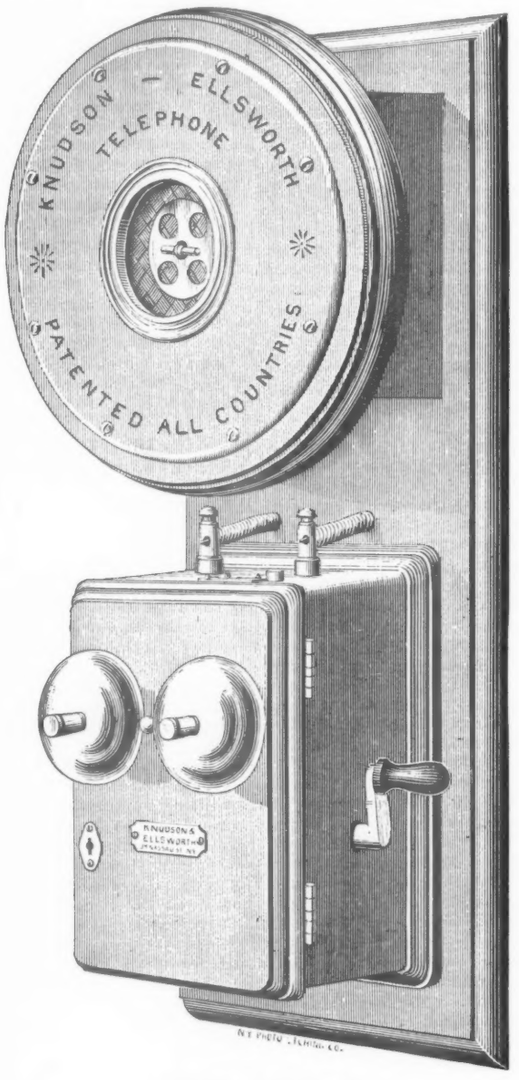
⁂ The President of these United States is now engaged in a telephone raid. Nine out of nineteen of these instruments heretofore in use by the War Department have been removed, and nine out of eighteen used in the Navy Department. This reform will extend further, and an investigation is now going on to ascertain the extent of the need for telephones at each Navy Yard and at army posts and headquarters. The officials at each public building in the United States will also be required to reduce the number of instruments in use, the general ratio of reduction probably to be one-half, as at the executive departments in Washington.

⁂ President Phillips, of the American Electrical Works, Providence, R. I., has issued the invitations to his annual clam bake, which is to be given at "Rhodes-on-the-Pawtuxet," Friday, Aug. 20 (this week). The design of the invitation is quite novel, and gotten up with the good taste that characterizes everything that is sent out from this house. These clam dinners are most pleasant gatherings of the electrical fraternity, and are always largely attended. The committee of arrangements this year is composed of Messrs. A. C. White, H. W. Pope, John I. Sabin, E. B. Baker, Geo. L. Beetle, and W. H. Sawyer.

⁂ Divers are learning to appreciate the telephone. At the Holyoke Dam, recently, the divers were at work under thirty feet of water, and communication was constantly kept up by telephone connection with men who were working the air pumps. A wire runs down to the helmet and passes through its metal wall to a small telephone. This greatly facilitates the operations of a diver, who is enabled to direct the operations of the hoisting engine or derrick which supply him with material, and to indicate exactly where he wants a stone or other bulky mass deposited. This is far in advance of the old system of signalling by jerks on a small line, which was not always possible or reliable when the diver was at a considerable distance.

⁂ At Budapest, Hungary, a somewhat novel and clever swindle was recently perpetrated by means of a telephone. The "Gisela Steam Mill" received by telephone an order for seven sacks of flour, the party pretending to be a flour dealer named Gluecksmann, who is a customer of the "Gisela Mill." Shortly afterward a young man appeared in the office of the mill with a written order and asked for the delivery of the flour. As Gluecksmann was in the habit of so ordering by telephone, the flour was delivered to the young man. At the same time the firm advised its customer that the flour ordered by him had been delivered. Soon a reply was received from Gluecksmann stating that he had neither ordered nor received the consignment of flour mentioned. The young man who had hauled away the flour of course was nowhere to be seen.

⁂ In its review of the leading men of Cincinnati, Ohio, the *Chronicle*, of San Francisco, contains the following: "Captain George N. Stone is one of the best business men in Ohio to-day. He is the brains of the Bell Telephone Company here, and by his shrewdness and business tact has succeeded in making it one of the most complete systems in the country. In every sense of the word, he is a self-made man. When a lad of twelve he was office boy in the law office of General Benjamin F. Butler, of Lowell. When the war broke out he secured a Second-Lieutenant's commission from Governor Sprague, of Rhode Island, and fighting all through the war came out as a captain of his company. After the war, he went to Colorado, and embarked in mining enterprises, with the usual result—unsuccessful. Upon his arrival in Cincinnati, he at once proceeded to the building of Chester Park, and, being a foresighted man, when the telephone was invented, he was one of the first to take an interest in the invention, and is to-day vice-president and general manager of the company in Ohio. The Captain is a man of great personal popularity; his charities are numerous, and he is not apt to tell his left hand what his right hand does."



Acoustic Telephone Set.

The Knudson - Ellsworth Acoustic Telephone.

Among the acoustic telephones, this one is presented by the inventors as possessing particular merit. A view of the telephone set is shown on this page. The telephone proper consists of a square wooden box, the front part of which is a round case of polished wood, which contains the diaphragm. This diaphragm is of novel design, and its inventors claim for it that it possesses greater resonance than any other. The latter is fastened by screws to this case, and has ample space for vibration in its chamber, as it were. A circular opening through the front of the case allows the voice of the speaker to impinge directly upon the diaphragm, which is composed of several layers of very thin and specially prepared strips of wood. The conducting-line wire is specially designed for this telephone, and patents have already been allowed for it. The wire passes through the diaphragm, and is securely fastened to a pin, which rests against a nickel-plated washer, the tension of the wire holding the latter in position tight against the diaphragm. Through a hole in the back of the wooden box the wire passes out, and is not allowed to touch anything but the hangers or supporters that are furnished for this purpose, until it reaches the diaphragm at the other end of the line. When call-bells are used, both these and the telephone are fastened on a back-board, as shown in the cut. One end of a fine copper wire is connected with the conducting wire, placing it between the diaphragm and the disk; the other end is connected with one of the screw-posts on top of bell-box. The other screwpost is connected by copper wire to a water or gas pipe, or any good conductor of electricity to moist earth.

Another Perpetual Motion Fiend.

Mansfield, O., August 8.—For half a century D. M. Cook has been a familiar figure in Richland County, and has been marked for his singular inventive genius. In 1850 when a young man, he became impressed with the wonders of electrical science, and then became enamored of its study. He began to delve into the unknown of this hidden force, and for thirty-six years, in alternately brilliant and adverse circumstances, has trodden over this field till there is no nook or corner with which he is unacquainted. He commenced his studies at a time when little was known of electricity, and by a pursuit of knowledge in that direction with unbounded zeal he has not only kept apace with the wizards of the day, but has so far gotten in advance of them that his assertions are almost accepted as altogether incredulous.

But no matter whether his claims seem wonderful and almost beyond belief, they are worthy of credence, for he must be placed in the list of successful inventors. In 1852 he conceived and constructed a device that revolutionized the manufacture of sorghum syrup. The device was called an evaporator, and was used to make syrup from sorghum. His principle was to run the juice across a heated surface in zigzag rows till the juice would run out as a pure syrup ready for the table, the water being evaporated in its passage, and the impurities being thrown to one side. On this he received letters patent in 1858, and in 1859 a company began the manufacture of the same. Thousands and thousands were disposed of, varying in price from $25 to $35, over $4,000,000 being realized, on which the inventor got a handsome royalty. Through this he derived quite a fortune, although a portion of it he spent in improving and introducing the device. Even to this day a firm in Cincinnati is engaged in the manufacture of this same evaporator, from which the members of the firm made themselves rich. Cook, however, several years ago lost his right to a royalty by some means or other, and has not been drawing anything from that source since.

Save for this slight diversion, Mr. Cook has not experimented in any field outside of electricity since thirty-six years ago to any considerable extent, but in this direction he can be said to have spent the greater part of his life.

For a while he sought to solve the question of cheap power, light, etc., by producing the proper current by means of a battery. He invented a battery of peculiar value for telegraph purposes, which was in use for a long time at Crestline, on the Western Union, and until the discovery of the cheap gravity battery that is now in use. But Mr. Cook long ago concluded in his own mind that in dynamic electricity lay future success. Accordingly, he cast aside the battery as a secondary affair, and set about to experiment with dynamos of novel and peculiar construction.

For several years past he would occasionally meet me and speak of his discoveries in the electrical field, but would say that he had not yet secured the result he was after. He would tell me, "When I get my experiments

completed I want to show you what will revolutionize the world. I propose to make a perpetual electric generator or motor which will propel itself by its own current, the resistance of the generator proper being only about ten per cent. of the rotary power of the electric engine upon which the current of the generator acts."

This assertion was sufficient to shock an ordinary person's nerves, but I accepted the statement with much allowance. However, I became interested and kept watching results.

Last November Mr. Cook came to me and said: "I have at last met with success. I have found the principle that I have been hunting for so long. I can now start a dynamo to going and it will never stop, except by the wearing away of its own parts. Not only will it run itself by its own current, but also produce power enough according to the size of the engine, to run any machine in the world."

"Perpetual motion," I suggested.

"More than that," he replied. "It is perpetual motion with only ten per cent. of the force used, leaving ninety per cent. for power to be utilized as is desired. Not only that, but more; one helix of my dynamo will produce light in proportion to its size, while the other is making the current that runs the engine. It will serve to heat your house, so that instead of having stoves and grates, little wires will run through your rooms, and on your parlor table will be a highly burnished apparatus containing wires, etc., which will keep the temperature of the house at whatever point you wish."

"What will be the cost to run it?"

"Nothing. As I said, start it, and it will go. Heat, power and light produced by one machine, for absolutely nothing."

I looked at him to see if he was there yet, and if so, whether he was mad, in earnest or joking. He laughed at my astonishment, and said: "I am now making a model, and when far enough along I will show it to you."

The matter was not specially discussed after that although he would frequently bring up the question, until a day or two ago, and I had my serious doubts whether he would ever show the device to me. I thought of Keely and his motor, and felt that the results Mr. Cook professed himself able to obtain were such that he would keep secret his machine—if he had any—in order to mystify the public. My surprise may be imagined, therefore, when Mr. Cook came to me a few days ago and said: "I believe I will show you my electric engine and generator. I am far enough along now to show you how the results are accomplished."

A time was fixed, and at the appointed hour Mr. Cook called and took me to his farm, about three miles south of Mansfield. As an excuse for a heavy crop of weeds in a fine field, where hundreds of bushels of wheat should have been harvested, he explained: "I have been so busy with my researches that I have been unable to put out any crops. I could get nobody to attend to the farm, and therefore it is nothing but a barren waste. I succeeded in getting a few acres of oats planted, and that, with a small potato patch, will be all I will derive this year from this fine tract."

Here he lives, as he has lived for years, with a wife and fourteen-year old daughter and his wife's sister. The latter is his enthusiastic assistant, and has helped him in many long years of toil. Distant from the house stands an old shop, wherein is hidden the secrets of his life. No stranger ever enters here, for it is herein that are contained the results of thirty-six years of labor. This seclusive rule has been almost invariable, having been broken but half a dozen times in over a third of a century. Several electricians and two or three others of known integrity have been admitted, but only after signing an iron-clad agreement not to reveal, patent, or cause to be patented, or improve without his consent, any of the parts shown to them.

The shop is dilapidated, as is the rest of the farm, so much is his mind taken up in the pursuit of his studies. The rear is used as a shelter for his trusty old horse, who has done near thirty years of royal service, while the front part is devoted altogether to his laboratory.

The agreement signed, Mr. Cook led the way to the door, but before unlocking it grasped me by the hand and bade me renew the promise made in the written agreement. This done, I was ushered into the mysterious room. I was bewildered by the appearance of the place. The room was large, and everywhere hung bundles of wire. Magnets of all shapes and sizes hung about the walls, and were scattered on the floor in confused heaps. In one corner was a huge machine, with large coils and magnets, which Mr. Cook told me was the first machine he attempted to make. But in the center of the room sat the pride of his life. I saw at a glance that this mysterious man had not wasted his time and fortune. He had branched out from the beaten track, and had produced a machine that differed in all respects from dynamos of present construction, except in that he also used wire and iron.

"This," said he, "is my perpetual electric generator and engine. I will call my assistant and show you how it works."

The machine was rudely constructed, for Mr. Cook made it all himself with a few old tools that had done too much service already. Parts of it were made of wood, and the whole was not put together in a very artistic manner, but it demonstrated his discoveries, and that was his only purpose in its construction. This model weighs three hundred pounds, and Mr. Cook said by the hand-power of one man could be generated current sufficient to light up from thirty to fifty sixteen candle-power incandescent lamps.

His assistant having arrived, who by the way is a young lady of handsome appearance, the work of demonstration began. I tested the current in several ways and found it very powerful. Having made electricity somewhat of a study I was surprised at the simplicity of many of the principles. The manner in which he expects to get the results heretofore mentioned, is theoretically correct, and there is no mechanical difficulty which he has not already overcome.

After examining the machine carefully in all its parts, I was conducted to anadjoining room, where, on a table, sat a smaller model of more accurate make. It contained a much better arrangement of the parts, and from what he told me I am compelled to believe all that Mr. Cook had told me. I asked him why he had not sought capital to develop his theories more rapidly, when he replied that he had not heretofore been ready. He said:

"I wanted to complete my labors so that I could say my work is done. I desired to give to the world a machine perfect in every particular, that would settle forevermore the question of cheap power, light and heat. Up to now my work was not finished. I am now almost done. Within a very short time I shall be able to show to all mankind that I have a machine that will revolutionize the world. When I can exhibit a running model, which I can in a few days, then I will be ready to consider the many propositions that I have already received."

Mr. Cook is about sixty-six years of age, and a more polished gentleman is hard to find. He is a fluent speaker, and his sentences are always grammatically correct. He has a wonderful flow of language, and his perfect knowledge of electricity becomes known in five minutes' conversation on the subject. He is familiar with all the electrical contrivances of the day, and it is a well-known fact in this vicinity that many years ago he lighted his own house by electricity, and long before electric light was known to the general public.

He has made over one million experiments in his life-time, and constructed over two hundred thousand models. He has thoroughly explored the electric field, and his inventions embody all that is valuable in electric light, electro-motors and electric generators beyond what is now before the public. Mr. Cook is a scientist in the broadest acceptance of the term, and is certainly one of the most thorough and faithful students of the electrical forces of this day, having spent over $50,000 in order to gain a full knowledge of this occult fluid.—W. F. H. in *Cincinnati Commercial Gazette*.

Money for the Electrical Subway Work in New York.

State Controller Chapin made his first demand on the telegraph, telephone and electric light companies, in behalf of the Subway Commission that has been in existence a little over a year, and thus far has received no money for its support. It has not even received funds with which to pay the rent of its offices or the expenses of clerk hire. Each of the commissioners is entitled to a salary of $5,000 a year, payable quarterly, but none of them has been paid a cent. Altogether, the board is out about $22,000. The expenses of the commission are to be paid entirely by the companies operating electrical conductors in this city. Each company is assessed pro rata according to the number of miles of wires that it operates within the city limits.

The commissioners have been trying to get the Controller to make an assessment for some time, but he thought best not to do so until after the contract to bury the wires had been signed by the construction company. When this was done last week, he called on the companies for information respecting the number of miles of wire that they used. They were compelled by law to furnish it. Last week each of the forty or more companies using electrical currents was informed that it was assessed at the rate of $4 a mile, and that 25 per cent. of this assessment was due. Some of the companies are reported pleased with these bills. The Metropolitan Telephone Company was put down as operating about sixty-six per cent. of all the wires used in New York, and was assessed accordingly. The officers were indignant, and declared that they would not stand it. Vice-President and General Manager Huidekoper said:

"We are heartily in favor of assisting the commission in its work, but we do not think that we should be asked to pay all its expenses. We are willing to send a check at any time for 25 or even 30 per cent. of the total assessment, but not more than that. According to our latest official returns, we have 6,018 subscribers, or about that number of miles of wire in use, and surely that is not over a quarter or a third of what is in use by all the companies. We will submit the matter to the commission."

Some of the companies, it is said, will refuse to pay the assessment. In case they do, the Controller has the right, according to the bill passed by the last Legislature, to issue warrants within thirty days to Sheriff Grant giving him the power to levy upon the property of such companies for the amount of the assessment and the costs of execution. These warrants, the law declares, shall be liens upon and shall bind the personal estate of the company from the time an actual levy is made, and the sheriff shall proceed in all respects and with the same effect as prescribed in regard to executions issued against property upon judgments given by a court of record, and shall be entitled to the same fees for his services in executing them.

Electricity or Cables.

At a recent meeting of the directory of the Metropolitan Railroad, of Boston, it was decided to introduce either electricity or the cable system in Boston. This plan, which was outlined in the *Post* some weeks ago, has been consummated, and President Richards has appointed a committee to thoroughly investigate the relative merits of both systems, and whichever proves in the opinion of the directors to be the most reliable and best in all respects will be adopted. The committee will visit New York, Chicago, Philadelphia and other places, and study the practical workings of both the cable and the electrical systems. The system that the committee recommends will undoubtedly be adopted by the directors for use on the long lines of the Metropolitan, and eventually all the lines will be run by the same system. Under the act of the Legislature authorizing consolidation of the street railways of this city the use of cable power is authorized, but nothing is said about electricity. Should the Metropolitan decide that the latter power is preferable, there would necessarily have to be further legislation, but it is believed the needed legislation could be secured without opposition next winter, and that would probably be as soon as the "plant" could be introduced.

TELEGRAPHIC

.... Telegraph instruments and wires can now be purchased in Japan, a factory having been established at Tokio.

.... Messrs. Partrick & Carter, of Philadelphia, have issued a very handsome catalogue illustrating the many electrical appliances they manufacture and control.

.... The Hess guest call, fire alarm and annunciator combined, of the Standard Company, Cincinnati, has proven quite a business success, and is meeting with favor wherever introduced. This was described in the REVIEW November 14, 1885.

.... The property and franchises of the Baltimore and Ohio Telegraph Company in Pennsylvania were sold at a meeting of the stockholders to the Baltimore and Ohio Telegraph Company for the purpose of consolidating the latter's interest in the State and adding to its efficiency.

.... The counsel for the Western Union Telegraph Company have filed notice of appeal to the General Term of the Supreme Court from the order of Judge Lawrence denying the motion for a new trial in the suit of John G. Farnsworth, receiver of the Bankers and Merchants' Telegraph Company.

.... Mr. John R. Martin, agent of the Norfolk and Western Railroad, at Farmville, Va., has in his possession the telegraph instrument which was in use at Appomattox Station in April 1865. It is a very old Morse instrument, made under the first patent taken out in America. On this instrument were sent all of General Grant's dispatches, both before and after the surrender of the Confederate forces.

.... A telegraph messenger, a small boy, delivered a message to a private residence the other Sunday night. When he reached the house, the clock from the City Hall tower chimed out the hour of midnight. He rang the door-bell several times. No one appeared to be about. He pounded on the door with no better result. Placing his mouth to the key-hole, he yelled with all his might and main the single word "Fire!" Several people were up in an instant. He delivered the message.

.... Charles Rogers, a Pittsburg mechanic, has just patented a device which it is said will revolutionize the barbed wire fence business. The invention is for barbing metallic strips about three-quarters of an inch wide, and with the machine barbs are cut ranging from one-quarter to one sixteenth of an inch in thickness. A machine capable of producing 60 miles of this barbed metallic strip per day can be built for $300. Machines for the same purpose now in use which are practically owned by a monopoly cost $25,000 apiece, and are only capable of producing 30 miles of wire per diem. A company has been formed with a capital of $300,000 to erect a suitable plant in this city which will be begun in a few days. A firm in Kansas City offers to take the entire output for a year.

.... Lightning struck a telegraph pole last Friday just outside the State Grain Inspector's office, Chicago, ran into the office on the switchboard of the telegraph instruments, and went out of the window on the other side, taking the glass, sash and all with it. A messenger boy who was sitting by the telegraph instrument was thrown 12 feet through the open door and knocked insensible. The telegraph operator, whose hand was on the keyboard, had his right arm paralyzed and was partially stunned. The telegraph apparatus was melted, the table was thrown across the room, and all the occupants of the apartment were stunned and partially deafened. Frank McCloud, a Board of Trade grain sampler, said the bolt looked like a round ball of fire about as large as a man's head. It shot in as far as the table, and disappeared with a flash, leaving the crowd standing bolt upright, with limbs rigid and ears ringing painfully.

ELECTRICAL AND SCIENTIFIC

* * Ex-Solicitor-General Goode has been appointed one of the special counsel for the Government in the suit to test the validity of the Bell patent.

* * The subject for the next international competition for the King of the Belgians' prize of $5 000 is "The Progress of Electricity, applied to motive power and illumination; its application and economical advantages." The essays have to be written in French.

* * The Maquay battery is a modification of the ordinary fluid bichromate. There are three peculiarities, claimed as improvements, in its construction. (1) The positive plate consists of an alloy of zinc, tin, lead and mercury, 95 per cent by weight being zinc. By the use of this alloy it is claimed that no further amalgamation is necessary, and that entire absence of local action is secured. (2) The porous pots are constructed from a mixture of two parts of carbon dust to six parts of the usual material from which cells are made. In this way the internal resistance of the cells is considerably reduced. (3) Simple means are provided for charging liquid, and also for absorbing the acid fumes.

* * The use of folding paddles has been a favorite idea with inventors for many years, but the practical difficulties which have attended such a method of propulsion have hitherto proved an insuperable bar to the successful application of the device to either river or ocean navigation. A Pittsburgh mechanic professes to have solved the problem of employing folding paddles to advantage, and a test of the usefulness of his device will shortly be made on the Ohio river. If the resistance of the paddles could be reduced to a minimum, as proposed by this new invention, the speed and consequent efficiency of river steamers would undoubtedly be greatly enhanced. Whether this method of propulsion may be safely applied to ocean steamers is a question to be decided only by repeated experiments.

* * "Moonlight nights—they are the bane of railroad engineers," remarked a head official of the Baltimore & Ohio Railroad last night. "All engineers dread moonlight nights. They try the nerves to their utmost. Engineers like to run on dark nights. On a moonlight night the trouble with them is no trouble at all—shadows. An engineer, looking out from his engine, sees before him all manner of shadows. He is sure that the dark shadow across the track he sees is a man or a rock, or some kind of an obstruction. He doesn't know, and he is kept in a state of nervous excitement all the time. Going around curves, along hillsides, many curious shadows are outlined on the track, and very often an engineer is so worked up over a night's ride that he is scarcely able to perform his duties."

* * A lacquered metal Japanese tray, with the profile likeness of a handsome young lady apparently burned into the lacquer, has been an object of much interest in Plainfield, N. J., for several days. The young lady is Miss Lilian Paul, and during a recent severe electrical storm she noticed that a small tray that lay upon a table in the bay window was attracting the lightning in what semed to be a dangerous manner, being the center of an almost constant blaze of light. Approaching for the purpose of removing it, she was suddenly startled by a fearful flash and hastily turned away, but waiting a few moments for an opportunity she succeeded in drawing it off and covering it with a rug. Nothing further was thought of this until next morning, when, on removing it, there was discovered a profile likeness of the young lady apparently burned into the lacquer of the tray. The tray will be placed on public exhibition.

New Automatic Burners.

Messrs. Shaw & Geary, of Philadelphia, have recently perfected a most desirable vibrating, electric gas burner, two views of which appear on this page. In Fig. 2 will be noticed the movable, pivoted electrode, which makes a rubbing contact with the other electrode (see top of cut). This sliding contact prevents the accumulation of dust, the burner working just as instantaneously after being idle for several months as if in constant use. The upright on the left (the other electrode) is fastened to the armature, a spring at the back holding it in position. This burner is compact, handsome and reliable, and will undoubtedly meet with popular favor in the hands of the progressive manufacturers.

The Experiments of M. Marcel Deprez.

In its issue of July 30, the London *Electrician* quotes the following from the London *Daily Times*:

"During the last ten years M. Marcel Deprez has been engaged in experiments connected with the transmission of force by means of electricity. The Rothschilds some time since provided him with an unlimited credit to prosecute his researches at Creil, under the inspection of a commission of thirty-eight men of science. On Friday the commission met to hear a report on the results at present obtained, drawn up at their request by M. Maurice Lévy. This report was unanimously approved. It appears from it that we can now, with only one generator and only one receptor, transport to a distance of about 35 miles a force capable of being used for industrial purposes of 52 horse-power, with a yield of 45-per cent., without exceeding a current of ten amperes. When the amount of force absorbed by the apparatus used to facilitate the recent experiment, but not required in the applications to industrial purposes, is added, the yield will be nearly 50 per cent. The commission certifies that the machines now work regularly and continuously. The maximum electromotive force is 6,290 volts. Before the construction of the Marcel Deprez apparatus the maximum force did not exceed 2,000 volts. The report states that this high tension does not give rise to any danger, and that no accident has occurred during the past six months. The commission is of opinion that the transmitting wire may be left uncovered on poles, provided it be placed beyond the reach of the hand. It estimates at nearly £5,000 the probable cost of the transmission of 50 horse-power round a circular line of about 70 miles. This price would, however, be much diminished if the machines were frequently constructed. The commission, in the name of science and industry, warmly congratulated M. Deprez on the admirable results which he had obtained, and expressed thanks to the Rothschilds for the generous aid extended to the undertaking."

On this the *Electrician* comments as follows:

"We may add to *The Times* account the satirical comment of another prominent French electrician, who is reported to have said that M. Marcel Deprez had succeeded in making certain wealthy Frenchmen believe (1) that the transmission of energy electrically was important; (2) that M. Marcel Deprez had invented the system of electrical transmission of energy, and (3) that his system was a gigantic success from every point of view. From this it will be gathered that we are not so satisfied that M. Deprez has succeeded in solving the problem. We are rather of opinion that the real problem has not been attacked."

FIG. 1.—VIEW OF IMPROVED GAS BURNER.

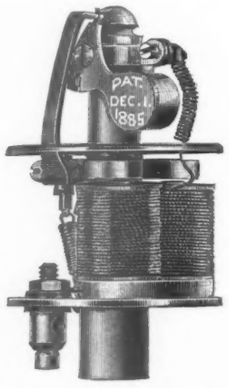


FIG. 2.—VIEW OF INTERIOR OF BURNER.

A Queer Stroke of Lightning.

While crossing the Iron Hill, Colorado, July 4, George Edwards was struck by lightning. It was considered fatal, but he is now recovering slowly. His case is a most remarkable one, and is attracting considerable attention from scientific men. Edwards, after the flash, remained unconscious for fully fifteen minutes before receiving assistance. The lightning struck him on the left cheek, knocking out a number of his teeth. It then passed diagonally across his breast to the right side, thence to the feet, coming out of the right foot, having passed entirely through the foot, leaving a hole very similar to one made by a bullet. His clothing was torn into fragments, particles being found a distance of two hundred feet from the spot, and one of the boots, both of which were torn into shreds, was found sixty feet away. Immediately underneath where Edwards was standing the ground was torn up for a considerable distance. The lightning's course along the body was shown by a black streak one and a-half inches wide. The worst result is the injury to the lungs, the immediate effect being a severe hemorrhage, by which a quart of blood was lost. In addition to these injuries the surface of the body was almost completely covered with blisters, the result of severe burns. This, it is said, is the first authentic instance of a person being injured by a stroke of lightning at an altitude of over 10,500 feet, and where persons affected internally, as Mr. Edwards was, are not killed instantly.

—— The city of Passaic, N. J., has a new style of thief. His name is Stanley Muir, and recently he stole an arc lamp from in front of a Passaic drug store, carried it to his boarding house and concealed it under his work bench. When it was discovered he was using the carbons in a battery. The fellow has a mania, it is said, for all kinds of electric apparatus.

—— At Elmira, N. Y., the Thomson-Houston Electric Company has just placed an order for another 100 horse-power boiler and a 180 horse-power engine. The company has been obliged to refuse orders for lights on account of its limited capacity; but this additional power, and the alterations and extension to the building, will enable it to more than double the number of lights it is now operating. While these extensive improvements are being made the company will use the building it first occupied as a lighting station, and with a 50 horse-power engine and two additional dynamos it will be enabled to fill orders for lights as fast as they can be put in.

Digest of U. S. Patents on Storage Batteries.

REFERENCES TO FOREIGN PATENTS OBTAINED THEREON.

(SEVENTH PAPER.)

1883.

290,611. Dec. 18, 1883. Filed April 23, 1883.
William Taylor and Frank King, London.
English pat., No. 3,409, July 18, 1882.
French pat., No. 140,860, Jan. 15, 1883.

The electrodes are formed by coiling tapes or strips of lead, which are soldered at their edges. The strips are cut from a disc of lead in a lathe by a special tool in such a manner, that one side of the strip will have a roughened or cellulated surface—and which is the subject of the claim.

290,941. Dec 25, 1883. Filed Oct. 20, 1882.
E. T. Starr, Philadelphia.

Lead shavings or finely-divided particles of lead have their surfaces oxidizated, or, are mixed with an oxide of lead, and then incorporated with shellac, beeswax, rosin, sulphur, or other non-active binding material, which requires the action of heat to soften or liquify it, and which upon cooling, will form a self-sustaining mass.

The claim is for an electrode constructed of a conglomerate mixture of finely divided lead or lead compound with a non-active binding agent.

290,943. Dec. 25, 1883. Filed July 11, 1883.
E. T. Starr, Philadelphia, Pa.

An open metal frame is formed with recessed or flanged sides and within the frame a metal ribbon or strip, or strips of lead of many folds or layers are arranged horizontally and secured to the frame. The connection with frame is made by pouring melted load over the ends of the strips and frame-pieces. The melted strip may be subjected to the action of nitric acid before arranging in the frame.

291,465. Jan.1, 1884. Filed Feb. 28, 1883.
1884.
English pat , 3,813, Aug, 10, 1882.
French pat., 140,860, Jan. 15, 1883.
J. S. Beeman, W. Taylor, Frank King, London, Eng.

Relates to a so-called regulation cell, which has for its object when placed in circuit with a set of storage batteries and the generating device by which they are charged, to cut the batteries out of the charging circuit when the operation of charging has been carried to the desired extent.

Within a battery cell is arranged a plate of relatively less storage capacity than the other plates of the battery. Over this plate is a gas chamber provided with a diaphragm. This diaphragm is adapted to be raised by the accumulation of gas in the gas chamber, and which, in turn, operates a make and break device.

291,526. Jan. 8, 1884. Filed Jan. 26, 1883.
E. J. Molera and J. C. Cebrian, San Francisco, Cal.

Pulverized or particles of carbon, coke, or charcoal, are mixed with particles of metallic lead, which may be oxidizated. To this is added molasses, or any saccharine matter; the paste is then molded and baked. The electrodes thus formed may be solid or provided with perforations. The surface of the electrodes may be covered with a paste of an oxide of lead mechanically applied. A box or containing-vessel made of wood or paper charred on the inside is described. The claims are for the construction of the electrodes and the box.

291,850. Jan. 8, 1884. Filed June 2, 1882.
E. R. Knowles, Brooklyn, N. Y.

The electrode consists of disks of lead and oxide of lead for the negative element, and lead and lead sponge for the positive element, piled one upon the other, each ending with a plate of metallic lead. The disks are rectangular in form, and have a similar-shaped opening in their center, through which passes a lead rod which holds the disk together.

292,034. Jan. 15, 1884. Filed Feb. 23, 1881.
E. J. Molera and J. C. Cebrian, San Francisco, Cal.

Relates to a commutator for storage batteries.

New Electric Light Station in Detroit.

The Brush Electric Light Company, of Detroit, is looking for a new building and plant which, it is said, will be the largest and most complete establishment of the kind in the United States. Wells W. Leggett, the president of the company, states that they have several sites under consideration, any one of which would be a vast improvement over their present location, but that they would probably not make a definite selection for several days to come.

"I am going away to-night in company with Mr. C. A Black, one of our directors," he said, "to look at and study the principal electric light establishments in the United States. We hope to learn a few things that will be of use to us in erecting our new building and plant."

"How large a building will it be?"

"I am not prepared to give you any details regarding the building, but we expect when it is completed to be able to point to it as the model electric light plant of the world. It will certainly be second to none at present in existence."

"Will it be located near the center of the city?"

"It is our desire to have it removed somewhat from the center of business. It is possible that it will be located east of Woodward avenue, but we have equally advantageous offers from property owners on the west side. Wherever it is put it will be free from the obnoxious smoke which is annoying people living in the vicinity of our present establishment."

—— The Hornellsville Electric Lighting Company has now furnished electric lights by the American system for the streets of this city for a little over two months. The time elapsed has been sufficient to enable our people to form a just estimate of their value, and we believe the almost unanimous opinion is one of unqualified satisfaction. Indeed, as the investigating committee on electric lighting of the city of Kingston, which visited this place and examined our plant on the 29th of June, officially reported to their Board of Aldermen: "It is practically demonstrated in Hornellsville that a town with 17 miles of closely shaded streets is thoroughly lighted with 55 lights." To no one is this fact more patent or a source of more satisfaction than to the railroad men and others of our citizens and the outside public whose business calls them out upon the streets at all times of the night. The steadiness and brilliancy of the lights are frequently commented upon, especially by commercial travelers and other visitors to this city who have seen the electric lights of other places. Said Mr. Messer, the head clerk of the Osborne House—which now has an arc light in the office and another in the billiard room—in a conversation last evening: "You have no idea how many traveling men compliment our electric lights. Hardly a night passes but more or less of these gentlemen notice them and remark as to their steadiness and power." "One gentlemen, a few evenings ago," continued Mr. Messer, "sat for an hour or more writing letters and reading papers by the electric lamp in this office. When he arose he looked up at the light, turning to me, with an expression of astonishment he asked me what light that was." Said Mr. Messer: "I told him it was the light of the American Electric Light Manufacturing Company, of New York. 'Well,' said the commercial man, 'I have seen the lights of about every existing system, but I never saw anything equal that light for steadiness in all my travels.'" Similar evidence is given by others. A *Times* representative talked last evening with the Messrs. Arms, proprietors of the Delevan House, who were among the first to patronize the electric light, putting one in their office and reception room, and another over the front entrance to their hotel. "Traveling men almost invariably," said Col. Arms, "speak of the superiority of our lights over those they see in Buffalo, Ithaca, Elmira, Rochester, Detroit, and other cities. They remark especially upon their steadiness and brilliancy. I have already made the electric lighting company a proposition to light the entire house with electricity."—*From the Hornellsville Daily Times.*

Water Power in Electric Lighting.

The town of Hermosand, in Switzerland, is the first place in Europe to substitute electricity entirely for gas for street lighting. The motive power is water, which is very plentiful there, rendering the light cheaper than gas. Many cities are lighted by electricity derived from water power, notably Quebec, illuminated by the Montmorency Falls; Lawrence, Mass., where the arc-lighting station is driven by the water power of the Merrimac; also electric lighting stations at Auburn and Rochester, New York; and many mills are lighted by electricity fundamentally derived from water power on a larger scale than the whole of this Swiss village.

An Electrical Crematory.

This is said to have been devised by a process described as follows: The body, being shrouded in sheets made of asbestos, is laid upon a frame composed of fire-brick, while at the head and foot are large copper plates, to which the leads from specially constructed dynamos of large electromotive force are attached. The body apparently occupies the position of the filament in an incandescent lamp, and, upon the current being passed through it, would be instantly carbonized; while, as the air would have free access to it, the process of destruction, or rather decomposition, would be immediate. The process appears to have the recommendation of great rapidity of action, and freedom from many of the objections to cremation in the ordinary way.

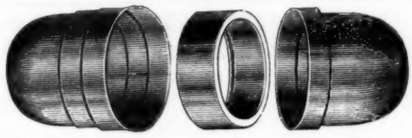


Fig. 1.—View of Parts of Solderless Floats.

Fig. 2.—Cross Section View.

Fig 3.—View of Complete Float.

Solderless Float of the Reliance Gauge Co.

Out of several hundred of these floats now in use, not one has yet filled with water or collapsed, although many of them are subject to a constant pressure averaging about 115 pounds. These floats are the invention of Mr. A. J. Wright, patent issuing April 20, 1886, for the United States, and July 9, of same year, for Canada. They are manufactured by the Reliance Gauge Co., of Cleveland.

The principle of these floats is very simple. They are made of two spherical overlapping parts joined together over an inner band provided with internal flanges, to give strength and furnish shoulders for the joint. The parts before being joined together are shown in Fig. 1.

These parts are united by special machinery, and when completed make a float of wonderful strength, and as close-jointed as if of one piece and jointless. Perhaps the construction may be better understood by the following (Fig. 2) cross-sectional view of the float completed.

These floats can be made of any desired shape and size, on the same principle, but Fig 3 illustrates the float used in the Standard size Reliance Alarm Gauges.

—— The Deer Park Electric Light Company, of Port Jervis, N Y., has been organized with a capital stock of $30,000.

—— Selma, Ala., after a test of her new electric lighting system, has adopted the same. The Council has ordered additional lights.

—— The City Council, of Richmond, Va., are considering the proposition of the Schuyler Electric Light Company to light the entire city for the sum of $36,000.

—— The Port Jervis Electric Light Co. has purchased a one hundred arc light plant from the Schuyler Electric Light Company, and that company has already commenced to erect the station.

—— The city of Yonkers has awarded a contract to the Schuyler Company for three years, for lighting the center of the city. A new 150 horse steam-engine will be immediately put in, and the incandescent system will be added to their arc plant.

—— Since the introduction of electric lights in Wilmington, Del., by the Arnoux Electric Light Company, the use of the light has steadily increased At first nothing but the arc light was used, but in December of last year the company introduced Edison's incandescent lamps; the number in use now being nearly 1,400. The work of putting in these lights is still progressing, and ere long the company expect to supply electricity for motor power.

—— So great has been the demand for electric lighting that the Lynn, Mass, Electric Lighting Company has placed a second boiler in its Stewart street works, increasing the capacity very materially.

—— The American Electric Manufacturing Company, of New York, has opened an office at 131 Devonshire street, Boston. Messrs. F. Montague Sowdon, Samuel Elder and L. B. Wright, under the firm name of Sowdon, Elder & Wright, having been appointed sole agents in New England.

—— Says a Providence electric light lineman: "While it is dangerous to mount a pole during a thunderstorm, the men become accustomed to it. The most aggravating work is to tackle a pole during a storm, as there are many which will give you a shock the moment you touch them. These poles are all marked by the men, and the worst among them are those at Turk's Head, the car depot, and two on the Westminster street circuit, where, if you get up, you will have to dance to get down again—that is, if you are not knocked down, as several circuit men have already been. The shocks received in this way are due to 'leaks' in the wires, which are only detected by a lineman getting in contact with the nearest pole to the leak."

ELECTRIC LIGHT NEWS

—— The Common Council Special Committee on Electric Light, of Cohoes, N. Y., have decided to grant a franchise to any local company that may organize.

—— The discovery of natural gas at Kansas City is not a surprise. There have long been surface indications of an inexhaustible reservoir of it in that immediate vicinity.

—— The representatives of the Edison Electric Light Company held their annual meeting Wednesday, August 11, at Long Beach. There was the usual large attendance, and important business matters were discussed and acted upon.

—— The Committee on Fire and Lighting of the New Orleans Council has unanimously reported favorably on an ordinance giving the right to Geo. B Lawrason to erect and maintain in New Orleans a system of lighting the city with electric incandescent lights.

—— The Schuyler Electric Light Company started a plant in Fulton, N. Y., on Saturday, consisting of 30 arc-lamps and some 50 incandescents. They have already subscribers for an equal additional number, which will be put in immediately.

—— Reports from our Massachusetts correspondents show that the new 300 arc-light plant installed by the American Company in the Arlington Mills, at Lawrence, Mass., is giving excellent satisfaction, and Treasurer Whitman is already contemplating an increase of capacity.

—— There is, it is said, a movement on foot just now for utilizing the celebrated Falls of Clyde for generating electricity. Turbines for working the dynamos are to be fitted up at Stonehouse, whence the electric current will be transmitted by cables to the town of Lanark, where it will be used for lighting and other purposes.

—— In addition to the two large buildings which the Edison Company have just purchased at Schenectady, there will be two more built, so that the works may easily accommodate 1,200 machinists. Of the buildings now standing, No. 1 will be devoted exclusively to the manufacture of electric apparatus, and in No. 2 shafting will be made and general machine work done.

—— Toledo, Ohio, is agitating the question of city lighting The bid of the Toledo Electrical Company is even more favorable to the people than that of the Gas Company, and it is understood the former propose to make a lively contest for the contract. It is evident, therefore, that whatever bid may be accepted, Toledo will be lighted on as favorable terms as the average city of the country. If the electric light is adopted altogether, we predict that Toledo's citizens will be satisfied.

—— At a meeting of the directors of the St. John (N. B.) Gas Light Company, held August 4, it was resolved to operate an electric lighting plant in connection with the gas supply. This course was taken in consequence of a favorable report made on the matter by the president of the company, Mr. John Blair, who, on June 16, was directed to make investigation of the subject. It is estimated that an expenditure of $25,000 will place the company in possession of a perfect electric plant.

—— The American Co. was first to make application to the Subway Commission in New York, for space in the new subway. President Goff says he has two sub companies already organized and ready to begin lighting business in New York and Harlem, viz.: The American Illuminating Company of New York, with a capital of $300,000, to do business between the Battery and Forty-second street, and the American Illuminating Company of Harlem, with capital of $100,000, to do business above Forty-second street and in Harlem.

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING AUG. 10, 1886.

346,902 Pneumatic and electric railway; Ellis F. Edgar, Woodbridge, N. J.

346,930 Telegraphic key; Robert A. Macready, New York, N. Y.

346,938 Heat regulator for incubators; Gustave A. Muenchinger, Newport, R. I.

346,942 Splice for underground cables; Wm. R. Paterson, Chicago, Ill., assignor to the Western Electric Company, same place.

346,957 Electrical meter; Wm. L. Stevens, Dorchester, Mass.

346,962 Telephone receiver; Wm. C. Turnbull, Baltimore, Md.

346,964 Automatic suspended switching device for electric railways; Charles J. Van Depoele, Chicago, Ill.

346,965 Armature for dynamo-electric machines; Ernest P. Warner, Chicago, Ill., assignor to the Western Electric Co., same place.

346,970 Electrical device for synchronizing clock pendulums; Harold Whiting, Cambridge, Mass.

346,971 Telegraph insulator; John Wilson, New York, N. Y.

346,972 Telegraph insulator; John Wilson, New York, N. Y.

346,990 Electrical conductor; Joseph R. Finney, Pittsburgh, assignor of one-half to Thos. B. Kerr, Allegheny, Pa.

347,013 Electric fuse for blasting; Jean P. A. Scola, Paris, France.

347,023 Spongy carbon battery; Emile Berliner, Washington, D. C.

347,025 Multiple series cut-out; Chas. F. Brush, Cleveland, Ohio.

347,029 Locking and releasing mechanism for locks; Wm. C. Fisher, Boston, Mass.

347,038 Automatic electric barrel register; Geo. W. Hey, Syracuse, assignor of one-half to Matthew J. Dolphin, Brooklyn, N. Y.

347,068 Electro magnetic permutation lock; Frederick Sedgwick, Cincinnati, Ohio, assignor to John H. Purdy, Chicago, Ill.

347,069 Electro-magnetic time lock; Frederick Sedgwick, Chicago, Ill.

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A. C. FOWLER, C.E., was Examiner in the U. S. Patent Office from 1880 to 1886, in the Interference and Electrical Divisions.

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National Electric Light Association,

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THE FOURTH MEETING—semi-annual—of the NATIONAL ELECTRIC LIGHT ASSOCIATION will be held at DETROIT, MICH., on Tuesday, 31st day of August, at 10 o'clock, A.M. Dues being payable in advance, all members are required to forward the same for the year 1886, by check or otherwise, payable to the order of J. F. MORRISON, President, Baltimore, Md.

Electric Light Companies and Manufacturers of Electric Light Apparatus, Supplies, &c., desiring to become members, must apply on or before August 31st, to the President, J. F. MORRISON, Baltimore, Md.

Members and others desiring information as to R.R. transportation rates will address J. F. NOONAN, Esq., Chairman Com. on Transportation, Paterson, N. J.

Special Hotel rates will be made known previous to meeting of the Association.

A. J. DeCAMP, Chairman Ex. Com.
Philadelphia, Pa.

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PATENTS for ELECTRICAL INVENTIONS.

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Fig.259

Fig.255

Fig.260

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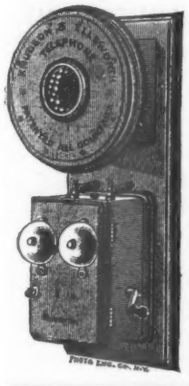

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2d.—Thirty-nine lights out of forty were cut out, one by one and that one burnt standard size; then the number was increased to three, and those were run at standard size without flashing at commutator and the machine cool.

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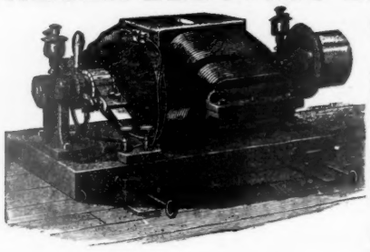

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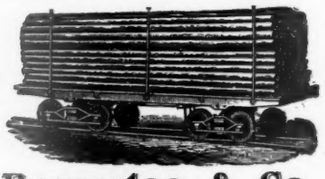

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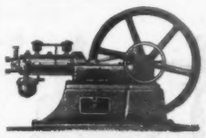

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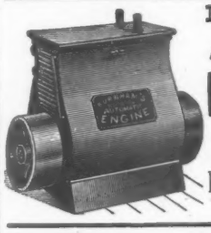

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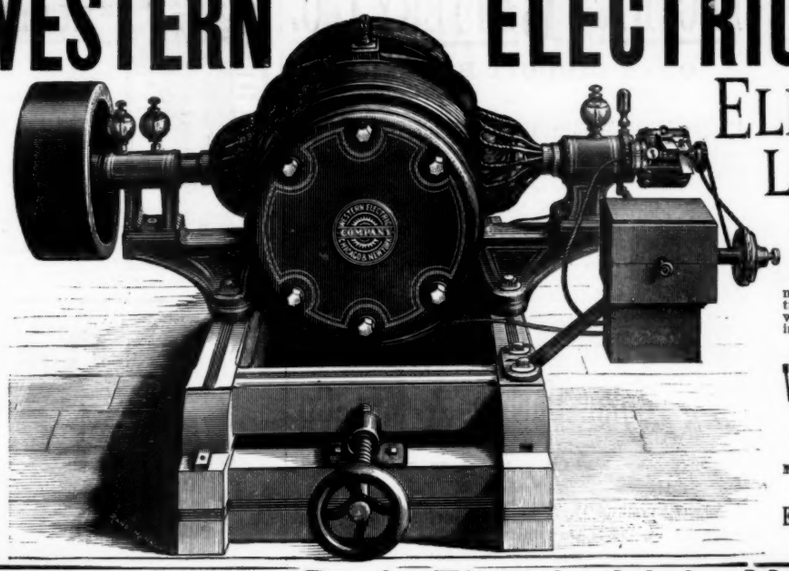

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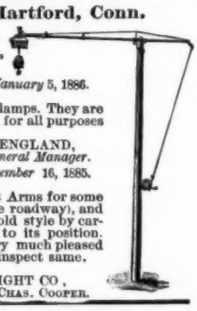

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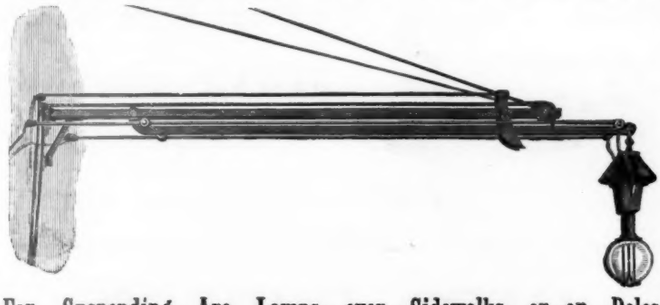

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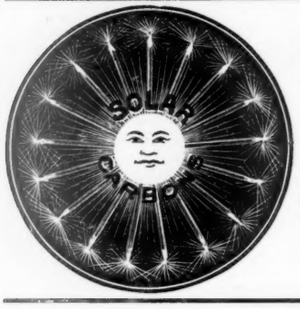

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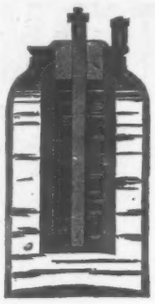

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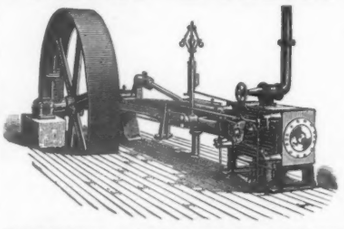

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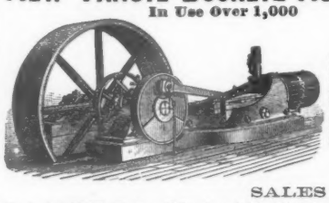

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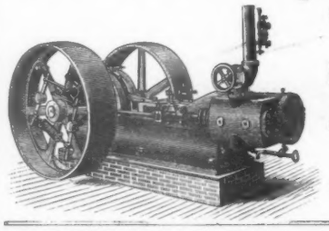

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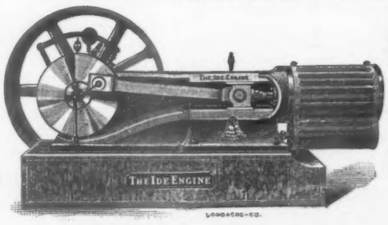

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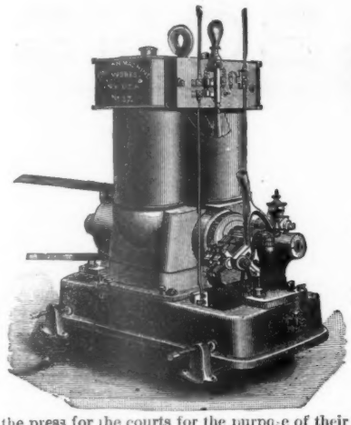

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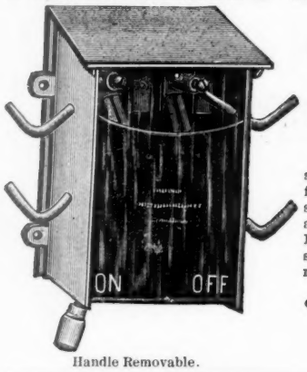

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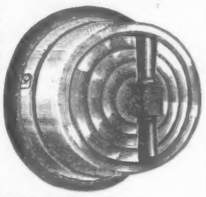

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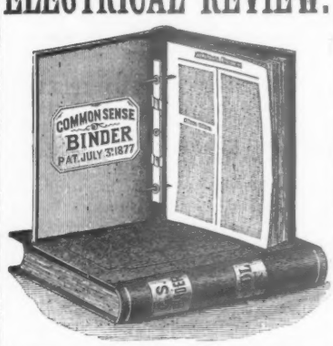

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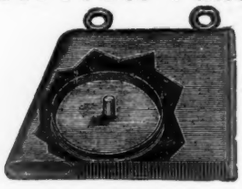

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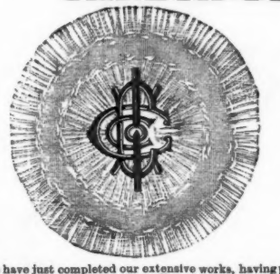

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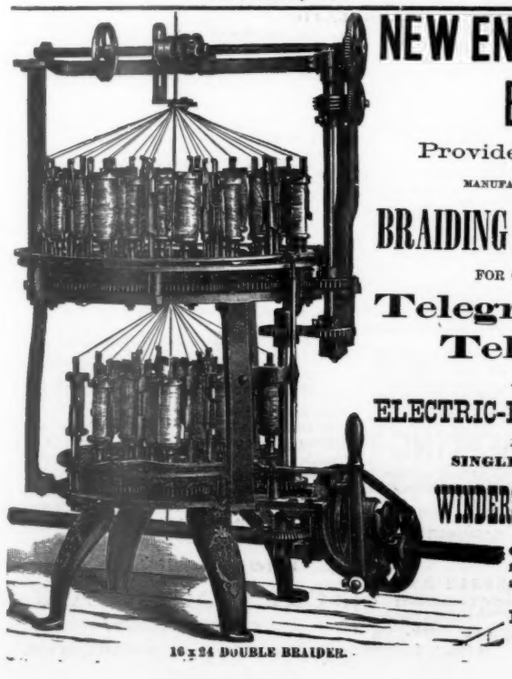

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